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Adrenal Pseudocyst: A Rare Entity in Adrenal Pathology: Case Report

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Abstract

Background:

Adrenal cysts are rare lesions, accounting for about 4% of adrenal masses. They are typically benign, hormonally inactive, and asymptomatic. While imaging plays a key role in diagnosis, differentiating benign cysts from malignant adrenal neoplasms can be challenging, especially for larger lesions. Management strategies remain controversial, particularly for intermediate-sized cysts.

Case:

We report the case of a 41-year-old woman under nephrological follow-up for cystic kidney disease, who was incidentally found to have a right adrenal cystic mass measuring approximately 5 cm during a thoraco-abdominal CT scan. Further MRI characterization revealed a well-defined lesion with benign features and no contrast enhancement. Hormonal evaluation was unremarkable. Given the absence of symptoms and hormonal abnormalities, a decision was made to pursue close clinical and radiological surveillance.

Conclusion:

This case highlights that adrenal cysts of moderate size can exhibit benign clinical, hormonal, and radiological characteristics, supporting a conservative management approach. Integrated assessment is crucial to avoid unnecessary surgery, especially in patients with comorbidities. Regular follow-up imaging is essential to monitor for any changes that may warrant intervention.

1.Introduction:

Adrenal cysts are a rare phenomenon in adrenal gland pathology, with an overall reported incidence ranging between 0.064% and 0.18%, representing about 4% of all adrenal masses [1]. Most of these are benign lesions, non-functional hormonally, symptomatic in only 10% of cases, with a slight female predominance and bilateral in about 3-8% of cases [2]. The size of an adrenal cyst can range from 0.5 cm to 20 cm (median size 4.8 cm) [3]. In the past, large adrenal cysts were typically discovered due to mass effect symptoms (pain and abdominal discomfort). However, the increasing use of diagnostic imaging in recent decades has led to an increase in the incidence of incidental adrenalomas, 1-2% of which were adrenal cysts [3]. Moreover, the presentation of adrenal cysts has changed: they tend to be diagnosed at

an earlier stage of development, being smaller and asymptomatic. Although most adrenal cysts are benign and non-functional hormonally, some may have an ambiguous appearance on imaging and mimic malignant adrenal neoplasms [1].

The diagnosis of adrenal cysts may be made through a combination of imaging and biological arguments, but it is often only confirmed during the pathological examination of the surgical specimen. Plasma or urinary measurements of adrenal hormones and their steroid derivatives or catecholamine metabolites are routine, but their normality does not definitively rule out a secretory tumor, especially a pheochromocytoma [4].

This study aims to report a case of an adrenal pseudocyst and to highlight the diagnostic challenges and therapeutic management associated with this rare clinical entity.

2. Case Presentation

A 41-year-old female patient followed in nephrology for cystic kidney disease, currently under annual surveillance, and with no other significant medical history, had a thoraco-abdominal CT scan ordered by her nephrologist as part of her renal cysts follow-up, which revealed a right adrenal incidentaloma.
The thoraco-abdominal CT scan identified a retroperitoneal cystic mass on the right, seemingly originating from the right adrenal gland, well-defined, oval-shaped, with regular contours, spontaneous density measured at 20 UH, unchanged after contrast administration, measuring 40 x 43 x 48 mm (L x AP x H).
A follow-up adrenal MRI was requested for better characterization of the mass, which showed a retroperitoneal lesion, seemingly arising from the right adrenal gland, well-limited with regular contours, hyperintense on T2, no signal drop on IP-OP sequences, and no enhancement after gadolinium injection, rapidly washing out on the LAVA sequences, measuring 54x52 mm in diameter. It displaced the inferior vena cava (IVC), hepatic segment V, and the upper pole of the right kidney.

The clinical examination revealed morbid obesity, blood pressure of 121/78 mm Hg on the left with no orthostatic hypotension, a pheochromocytoma score of 0, no purple and wide stretch marks, small whitish stretch marks on the abdomen and the thighs, no facial erythema, no capillary fragility signs, no hyperandrogenism, and no lumbar tenderness.

Biological testing (plasma and urine tests for catecholamine metabolites and cortisol after dexamethasone suppression) did not reveal any abnormality indicative of a secretory tumor.

The decision was to adopt a watchful waiting approach with strict monitoring, primarily based on follow-up adrenal MRI to be performed in six months, in order to assess any lesion progression that would constitute a major argument in favor of a more radical management strategy.
The follow-up MRI demonstrated stability of the right adrenal lesion, with no evidence of progression.

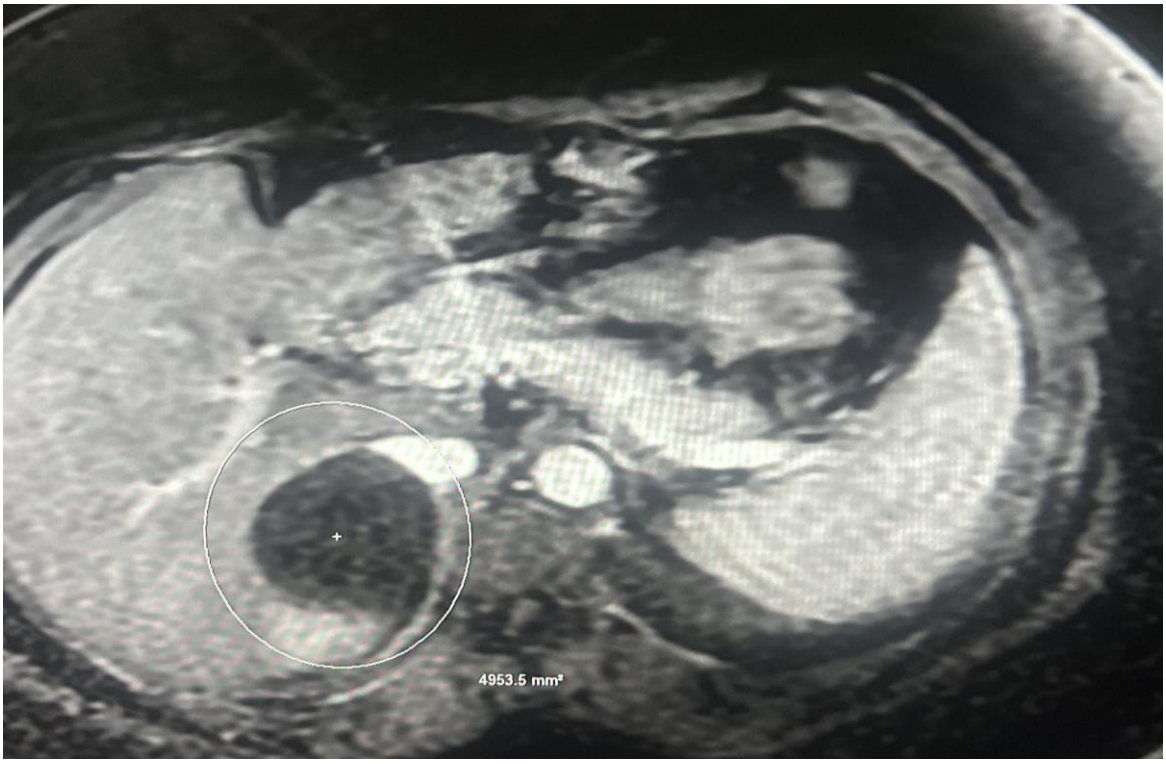

Figure 1 : IRM en coupe axiale pondérée T1 montrant une formation lésionnelle aux dépens de la loge surrénalienne droite, en franc hyposignal T1.

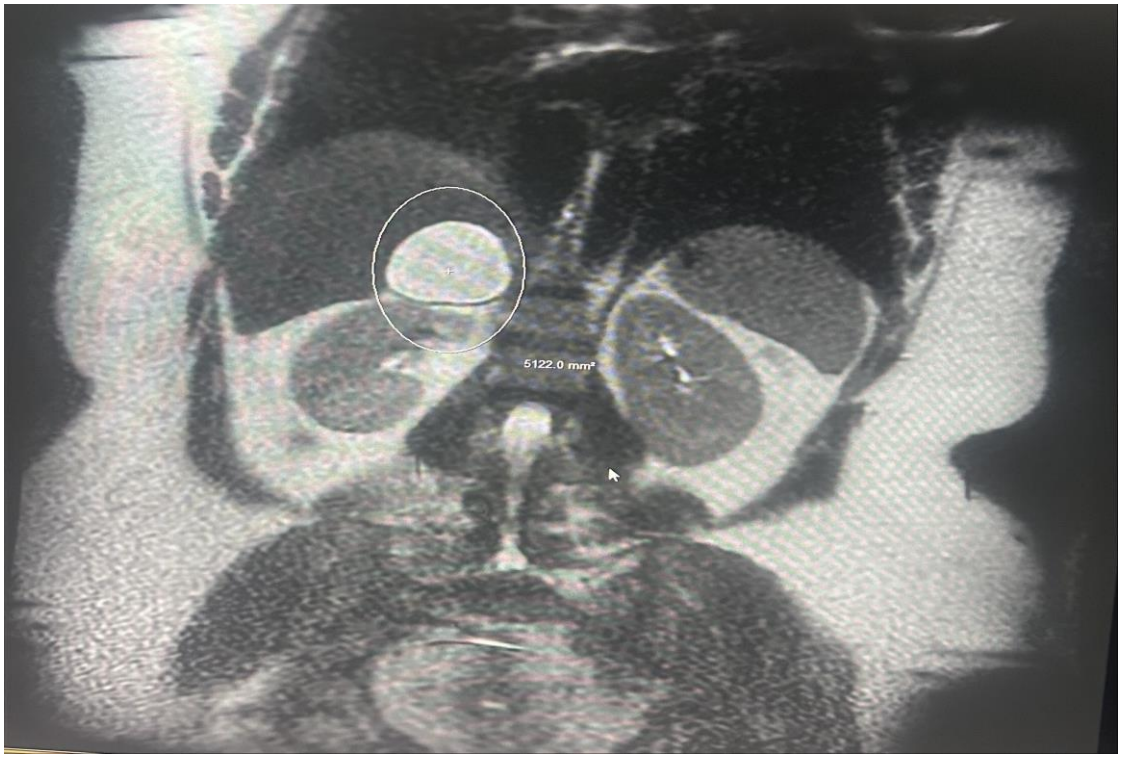

Figure 2 : IRM en coupe axiale pondérée T2 montrant une formation lésionnelle aux dépens de la loge surrénalienne droite, en franc hypersignal T2.

3.Discussion:

Adrenal pseudocysts are rare lesions but account for a substantial proportion of adrenal cystic masses. In a recent systematic review of the literature (2000–2023), they represented the majority of reported cases [5].

In the study by Medeiros et al., involving eight cases, the median age was 41 years, which corresponds precisely to the age of our patient [6].

A female predominance has been described in several series [5].

Pseudocysts are most often unilateral. Bilateral involvement has been reported but remains uncommon, without any clear right-to-left predominance [7].

The broad pathohistological spectrum of adrenal cysts includes pseudocysts, endothelial (vascular) cysts, parasitic cysts, and epithelial (mesothelial) cysts [7]:

- Parasitic cysts (7% of cases) correspond to a rare adrenal localization of hydatid disease. Diagnosis relies on the identification of the parasite or its components within the cyst, particularly the scolex or the germinative membrane.
- Epithelial cysts (9% of cases) present an epithelial lining, although their etiopathogenesis remains controversial. An embryologic origin is frequently suggested, whereas fluid collections arising within adrenal adenomas are generally considered pseudocysts.
- Pseudocysts (39% of cases) are characterized by a fibrous wall lacking epithelial or endothelial lining. These lesions may result from various causes, particularly hemorrhagic, ischemic, or infectious processes, or even tumoral degeneration. Their size and heterogeneity often complicate the differential diagnosis with necrotic malignant tumors.
- Endothelial cysts (45% of cases) have an endothelial lining and contain chylous or hemorrhagic fluid, with calcifications present in 15% of cases. Lymphangiomas are far more common than angiomas. These lesions are classically considered hamartomas but may also reflect lymphatic or vascular stasis.

Adrenal cysts are most often asymptomatic and incidentally discovered. When symptoms occur, they are usually nonspecific, including lumbar pain, digestive discomfort, or the palpation of a flank mass. Endocrine manifestations, although more suggestive, are rare; arterial hypertension is the most frequently reported sign, whereas adrenal insufficiency and Cushing syndrome are exceptional. Rarely, traumatic rupture or intracystic hemorrhage may lead to an acute presentation [8].

The adrenal cyst in our patient was likewise discovered incidentally, consistent with the literature. As in our case, plasma or urinary hormone assessments (cortisol, ACTH, metanephrines) are almost always normal, as these cysts rarely have endocrine repercussions [9].

According to the largest series of benign adrenal cysts published in 2022, cyst size ranges from 0.5 to 20 cm [10]. Younger patients (median age: 37) typically present with larger cysts (>5 cm), whereas older patients (median age: 51) tend to have smaller lesions (<5 cm) [10].

This suggests that the size of the pseudocyst observed in our patient (5.4 cm) is consistent with published data.

Radiologically, benign adrenal cysts generally appear as well-defined, thin-walled, ovoid masses. They are homogeneous, anechoic or hypoechoic on ultrasound, while on MRI they typically show low signal intensity on T1-weighted sequences and high intensity on T2-weighted sequences [10].

On CT, they usually demonstrate low attenuation (0–20 Hounsfield units), placing them among benign or intermediate-risk adrenal masses [10,11]. Except for occasional enhancement of the cyst wall, no contrast enhancement is expected within the cyst itself [10,11].

The decision to pursue surgical or conservative management depends on lesion size and imaging characteristics, patient symptoms, and hormonal activity. Approximately 50% of adrenal cysts are surgically treated, although most cases are asymptomatic [10,11].

The management of asymptomatic cystic adrenal lesions mirrors that of other adrenal incidentalomas [7]. Current guidelines recommend that asymptomatic, non-functioning adrenal incidentalomas with benign imaging features and a diameter ≤4 cm do not require surgical intervention [11]. However, according to the same recommendations, larger adrenal tumors with benign characteristics should be assessed on a case-by-case basis, mainly due to concerns regarding the potential increased risk of malignancy in lesions >4 cm [11–12-13].

Adrenal pseudocysts have an extremely low malignant potential, particularly in the absence of hemorrhage, wall thickening, or rapid growth.

If a conservative approach is chosen, follow-up imaging (CT or MRI) should be performed at 6–12 months, or earlier if symptoms of mass effect or new clinical signs arise. Adrenal cysts may continue to enlarge in one-third of patients during surveillance, whereas a decrease in size is rare but possible. Demonstrated growth is a major argument in favor of more aggressive management [14].

A series reported by Foster et al., involving 98 adrenal cysts, showed that most pseudocystic lesions remained stable over several years of follow-up [15].

Thus, strict radioclinical monitoring with repeat MRI at 6 months, as planned for our patient, aligns with current standards. Such follow-up enables early detection of morphological changes (size increase, contour irregularity, enhancement, heterogeneity) that may necessitate reconsideration of the management strategy toward surgical intervention.

4.Conclusion:

The adrenal cyst in our patient, although measuring 5 cm, exhibited clinical, hormonal, and radiological features consistent with a benign lesion. In the absence of functional signs or concerning evolution, a strict surveillance strategy was favored, in line with current guidelines. This conservative approach is further justified by the patient's comorbidities, including morbid obesity and chronic kidney disease. Follow-up imaging at 6 months remains essential to detect any changes that may warrant surgical intervention.

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